Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RANADEEP DUTTA

Appeal No. 1999-2838
Application No. 08/812,848

ON BRIEF

Before RUGGIERO, DIXON, and BARRY, Administrative Patent Judges.
RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 1-14, which are all of the claims pending in the present application. An amendment after final rejection filed November 10, 1998, which amended claims 1 and 2, was approved for entry by the Examiner.

The claimed invention relates to a structure for terminating the active area of a high voltage semiconductor device. More particularly, the termination structure includes a

plurality of very lightly doped spaced concentric P type diffusion rings in the N epitaxial layer of the device surrounding the outer periphery of the device active area. The low dose P type diffusion rings have a concentration produced by an implant dose of from about 2E12 to 2E13 atoms/cm^2 which, according to Appellant (specification, page 3), serves to lower the electric field at the surface of the epitaxial layer.

Claim 1 is illustrative of the invention and reads as follows:[1]

1. A termination structure for a semiconductor die; said semiconductor die having a body of silicon of one of the conductivity types and an upper N epitaxial layer for receiving diffusions therein; said N epitaxial layer having an active area diffused therein; a first electrode means connected to said active area; said active area having an outer periphery; said N epitaxial area and said die having an outer peripheral street; said first electrode and said street being connectable to potential differences in excess of about 600 volts; said termination structure comprising a plurality of spaced concentric P type diffusion rings in said N epitaxial layer surrounding said outer periphery of said active area to distribute the electric field between said first electrode and said street; said P type diffusion rings having a concentration produced by an implant does [sic, dose] of from about 2E12 to 2E13 atoms/cm^2 to reduce the electric field at the surface of said N epitaxial layer and to prevent their complete depletion at full reverse voltage.

The Examiner relies on the following prior art:

[1] The word “dose” is misspelled at line 15 of claim 1.

Zommer	5,629,552	May 13, 1997 (filed Jan. 17, 1995)

Claims 1-14 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Zommer.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the Briefs[2] and Answer for the respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellant's arguments set forth in the Briefs along with the Examiner's rationale in support of the rejection and arguments in rebuttal set forth in the Examiner's Answer.

[2] The Appeal Brief was filed May 3, 1999 (Paper No. 12). In response to the Examiner's Answer dated July 12, 1999 (Paper No. 13), a Reply Brief was filed September 14, 1999 (Paper No. 14) which was acknowledged and entered by the Examiner as indicated in the communication dated September 23, 1999 (Paper No. 15).

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the invention as set forth in the appealed claims 1-14. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole

or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

With respect to claim 1, the sole independent claim on appeal, Appellant asserts the Examiner's failure to establish a prima facie case of obviousness since all of the claim limitations are not taught or suggested by the applied Zommer reference. In particular, Appellant contends (Brief, page 13; Reply Brief, page 4) that the Examiner has not convincingly

established how Zommer provides any teaching or suggestion of the implant dosage recited in appealed claim 1.

After reviewing the Zommer reference, we are in agreement with Appellant's position as stated in the Briefs, i.e. the Examiner has not satisfied the burden of establishing how the volumetric impurity concentration value set forth in atoms/cm^3 in Zommer satisfies the claimed implant dosage requirement expressed as an area value in atoms/cm^2. We are in particular agreement with Appellant's contention that there is simply not enough information in Zommer so as to enable a skilled artisan to convert the disclosed volumetric impurity concentration value to a specific implant dosage value. As pointed out by Appellant (Reply Brief, page 2), an infinite number of implant dosage values could result in the volumetric impurity concentration expressed in Zommer; however, without specific diffusion characteristic information such as depth and profile which is lacking in Zommer, it is impossible to convert Zommer's concentration value to a specific implant dose as claimed. In our view, any suggestion by the Examiner to assign characteristics such as ion acceleration, peak concentration, and annealing profiles from Appellant's specification to the

disclosure of Zommer has no basis of support in Zommer and could only come from an improper attempt to reconstruct Appellant's invention in hindsight.

As further alluded to by Appellant, it is apparent that the Examiner has recognized the difficulty in attempting to convert Zommer's volumetric concentration value to a implant dosage value and, instead, attempts to improperly convert Appellant's claimed dosage value into a volumetric impurity concentration value. We agree with Appellant that the Examiner's analysis at pages 4 and 5 of the Answer is based on assumptions which have no basis in the applied prior art. As pointed out by Appellant, the transfer function equation from the Sze publication referenced by the Examiner for converting impurity concentration in atoms/cm^3 to implant dosage in atoms/cm^2 is based on a maximum impurity concentration value. We find no disclosure in Zommer which characterizes the disclosed impurity concentration value as a maximum or peak value. In order for us to sustain the Examiner's rejection under 35 U.S.C. § 103, we would need to resort to speculation or unfounded assumptions or rationales to supply deficiencies in the factual basis of the rejection before us. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA

1967), cert. denied, 389 U.S. 1057 (1968), rehearing denied, 390 U.S. 1000 (1968).

In view of the above discussion, it is our view that, since all of the limitations of the appealed claims are not taught or suggested by the prior art, the Examiner has not established a prima facie case of obviousness. Accordingly, the 35 U.S.C. § 103 rejection of independent claims 1, as well as claims 2-14 dependent thereon, cannot be sustained. Therefore, the decision of the Examiner rejecting claims 1-14 is reversed.

REVERSED

JOSEPH F. RUGGIERO Administrative Patent Judge	)	
JOSEPH L. DIXON Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)	

JFR/lp

Appeal No. 1999-2838
Application No. 08/812,848

OSTROLENK, FABER, GERB & SOFFEN
1180 AVENUE OF THE AMERICAS
NEW YORK NY 10036-8403

Letty

JUDGE RUGGIERO

APPEAL NO. 1999-2838

APPLICATION NO. 08/812,848

APJ RUGGIERO

APJ BARRY

APJ DIXON

DECISION: **REVERSED**

PREPARED: Oct 9, 2002

OB/HD

PALM

ACTS 2

DISK (FOIA)

REPORT

BOOK